

What is claimed is:

1 1. An electric power steering device comprising:

2 a rack bar converting a rotational motion of a steering shaft to a longitudinal,
3 linear motion and changing a steering angle;

4 a motor rotationally driving a motor shaft based on a steering torque generated by
5 said steering shaft, said motor shaft forming a diagonal intersection with said rack bar; and
6 drive transmission means transmitting a rotational drive from said motor shaft to
7 said rack bar as an auxiliary propulsion force;

8 said drive transmitting means comprising:

9 a drive gear rotating in tandem with said motor shaft and formed as a bevel gear with
10 linearly extending teeth;

11 a ball screw mechanism disposed co-axial with said rack bar and converting rotational motion
12 to linear motion;

13 and a driven gear rotating in tandem with a nut of said ball screw mechanism,
14 meshing with and moving in tandem with said drive gear, and formed as a bevel gear with linearly
15 extending teeth; and

16 backlash for said drive gear or said driven gear or backlash between said drive
17 gear and said driven gear can be adjusted in a continuous, non-stepped manner.

1 2. The electric power steering device as described in claim 1, wherein at least one of
2 said drive gear and said driven gear is secured after being moved in an axial direction.

1 3. The electric power steering device as described in claim 2, wherein said motor
2 shaft and said drive gear form one of a serration fit and a spline fit, and said drive gear is rotatably
3 supported by an inner housing secured to said housing after being moved in an axial direction
4 relative to said housing.

1 4. The electric power steering device as described in claim 2, wherein said nut and
2 said driven gear are integral within said housing, and said driven gear is rotatably supported by an
3 inner housing secured to said housing after being moved in an axial direction relative to said
4 housing.

1 5. The electric power steering device as described in claim 1, wherein at least one of
2 said teeth of said drive gear and said teeth of said driven gear is movable along a pitch circ

1 6. The electric power steering device as described in claim 1, wherein at least one of
2 a section of said teeth of said drive gear and a section of said teeth of said deiven gear is movable
3 along a pitch circle.

1 7. An electric power steering device as described in claim 5, wherein at least one of
2 said drive gear and said driven gear is formed from a first gear serving as a section of a teeth face,
3 a second gear serving as a remaining section of a teeth face, and biasing means biasing said first
4 gear and said second gear toward or away from each other along a pitch circle.

1 8. An electric power steering device as described in claim 6 wherein at lest one of
2 said drive gear and said driven gear is formed from a first gear serving as a section of a teeth face,
3 a second gear serving as a remaining section of a teeth face, and biasing means biasing said first
4 gear and said second gear toward or away from each other along a pitch circle.

1 9. An electric power steering device as described in claim 2, wherein said housing
2 includes a grease reservoir, disposed below said drive gear and said driven gear, storing grease.

1 10. An electric power steering device as described in claim 3, wherein said housing
2 includes a grease reservoir, disposed below said drive gear and said driven gear, storing grease.

1 11. An electric power steering device as described in claim 4, wherein said housing
2 includes a grease reservoir, disposed below said drive gear and said driven gear, storing grease

1 12. An electric power steering device as described in claim 5, wherein said housing
2 includes a grease reservoir, disposed below said drive gear and said driven gear, storing grease.

1 13. An electric power steering device as described in claim 6, wherein said housing
2 includes a grease reservoir, disposed below said drive gear and said driven gear, storing grease.

1 14. An electric power steering device as described in claim 7, wherein said housing
2 includes a grease reservoir, disposed below said drive gear and said driven gear, storing grease.

1 15. An electric power steering device as described in claim 8, wherein said housing
2 includes a grease reservoir, disposed below said drive gear and said driven gear, storing grease

1 16. An electric power steering device as described in claim 1, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect

1 17. An electric power steering device as described in claim 2, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.

1 18. An electric power steering device as described in claim 3, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.

1 19. An electric power steering device as described in claim 4, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.

1 20. An electric power steering device as described in claim 5, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.

1 21. An electric power steering device as described in claim 6, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.

1 22. An electric power steering device as described in claim 7, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.

1 23. An electric power steering device as described in claim 8, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.

1 24. An electric power steering device as described in claim 9, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.

1 25. An electric power steering device as described in claim 10, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.

1 26. An electric power steering device as described in claim 11, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.

1 27. An electric power steering device as described in claim 12, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.

1 28. An electric power steering device as described in claim 13, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.

1 29. An electric power steering device as described in claim 14, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.

1 30. An electric power steering device as described in claim 15, wherein a seal is
2 disposed between said ball screw mechanism and said drive gear and said driven gear to provide
3 a sealing effect.